period, using the FCC's prescribed asset lives and AT&T's recommended cost of capital. It then divides each asset's annual cost factor by the appropriate growth-to-current-demand ratio. In addition, AT&T applied adjustments to Verizon's fill factor calculation and computed an average distribution fill factor of 56%.[199] The CLEC Alliance, offering similar arguments, also supports a distribution fill factor of 56%.

The CLEC Coalition advocates use of the 50% distribution fill factor adopted by the Commission in the first proceeding. It contends that by starting with a distribution fill factor of 60% at current demands and adjusting it to reflect both long-term demand and construction breakage,[200] Verizon overstates its adjustment, given that part of the ultimate demand requirements would be met simply through construction breakage. It asserts as well that Verizon's treatment of its loss of market share leads to the absurdity that the smaller its market share, the smaller the distribution fill factor.

In response, Verizon maintains that its 40% fill factor for loop distribution plant is supported by the Phase 1 estimates of its central engineering staff; by its quantitative analysis in this case, based on a series of adjustments to the 60% utilization level; and by the application of adjustments and corrections to the 50% factor adopted by the Commission in the First Proceeding. It contends that all three methods converge on a 40% figure. Verizon's quantitative analysis starts with a 60% utilization factor, reflecting two lines per zoned household in an ultimate demand construct and an actual household demand

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[199] Id., pp. 38-39.

[200] Breakage refers to what is otherwise termed the "lumpiness" of investment, i.e., the existence of minimum quantities of installable capacity, which makes it impossible to precisely match new installations with demand. For example, if the smallest piece of equipment that can be installed will serve five units of demand, a single unit of demand that cannot be served by existing facilities will require installation of five units of capacity.

of about 1.2 lines. It contends industry experience has shown a need to install sufficient distribution cable capacity at initial construction to accommodate the long-term potential peak demand in the distribution area; a failure to do so leads to continuing service problems, high operating costs, and costly capacity additions. It contends that two pairs per household is a reasonable ultimate demand allocation despite the advent of DSL- based technologies that can derive two or more lines from a single physical loop. Verizon contends further that actual demand will be reduced on account of undeveloped land, vacancies, and the fact that some customers will not use Verizon's infrastructure. On the basis of forward-looking estimates of those factors, it multiplied its 60% utilization factor by 90% to reflect unbuilt but zoned land, 95% for vacancies, 90% for customers who do not use Verizon's wire-line network, and 90% for breakage. The resulting figure was a fill factor of 41.6%, which Verizon considers consistent with the 40% estimated by its outside plant engineers in the First Proceeding. As noted, the Commission there adopted a 50% fill factor, but Verizon contends the Commission's analysis was flawed in several serious respects.[201]

Verizon disputes the charge of a mismatch in charging current customers for the spare capacity associated with ultimate demand, arguing that the cushion benefits current customers who, without it, would suffer degraded service. Future customers, it contends, will have their own level of demand and require their own cushion. It likewise sees no unfairness in charging CLECs for spare capacity they cannot use, given that the capacity is available for purchase by them if they need it; it contends that TELRIC requires carriers to bear the cost of facilities even if they are not immediately entitled to use them. It sees no speculation regarding how much demand will emerge at what time, and it contends that the FCC's rejection of ultimate demand was set forth in the context of

[201] Tr. 2,449-2,452.

determining relative, not absolute costs and included a statement by the FCC that the decision was not necessarily appropriate for UNE costing purposes. (It nevertheless disputes as well the substance of the FCC's conclusion, rejecting, once again, the notion that an ultimate demand analysis is speculative.) It likewise disputes the charge of double count between the breakage adjustment and ultimate demand analysis, explaining that the breakage adjustment means that some deployed pairs will not be needed even to serve ultimate demand, and it sees no absurdity in associating a lower distribution fill factor with a lower market share, contending that competition tends to increase the uncertainty confronted by planners and that uncertainty, in turn, tends to diminish utilization factors.

It is important to remember that in resolving this issue we are pursuing not truth so much as fairness and reasonableness. We are not trying to uncover the one "correct" fill factor, on the premise that we could identify it if only we had enough information; rather, we are attempting to select a fill factor that strikes a reasonable balance between the clear engineering need to design a system whose capacity exceeds the demand initially imposed on it and the equally clear regulatory need to avoid imposing on purchasers of a price-regulated good the costs of excess capacity beyond reasonable requirements. As is so often the case in regulation, therefore, there is a range of reasonable factors--this record suggests that range for distribution plant runs from something above 40% to something below 56%--and it is necessary to choose a point within that range. It is also necessary to consider the place of ultimate demand in the analysis.

Verizon correctly argues that the FCC has not ruled out the use of ultimate demand; and it seems clear that ultimate demand must be taken into account to ensure that the contemplated system will be properly sized. The more difficult question is how to spread the associated costs, and AT&T fairly argues that current customers should not bear the full cost of

serving demand that is not expected to eventuate for ten years. AT&T's method for assigning the costs of some estimate of average demand over the ten years is needlessly complex and cumbersome. A better alternative is to recognize ultimate demand by taking account of the net present value of the ten-year average demand, assuming annual growth of 3%.[202] The link cost calculator should be modified accordingly.

As for the distribution plant fill factor, Verizon derives its 40% figure by starting with a presumed actual household demand of 1.2 lines. That figure appears low, given the recent trend:

Average Residential Lines per Living Unit[203]

1997 -- 1.18
1998 -- 1.22
1999 -- 1.25

In view of this trend, presumably attributable in large measure to growth in Internet usage, AT&T's estimate of 1.3 lines appears more reasonable as an estimate for 2002, and it will be used here for calculation purposes. (Updated data, if available, may be presented on exceptions and should be taken into account by the Commission in its decision.) The resulting factor, assuming use of two cable pairs per zoned residential unit (which, as Verizon suggests, remains a reasonable figure) is 65%.

Verizon then adjusts that factor (actually, its own 60% figure, reflecting 1.2 residential lines per living unit) by 75%, reflecting the combined effect on demand of vacancies (-5%), undeveloped parcels (-10%), and customers lost to competitors (-10%). These adjustments are all sound in concept--notwithstanding AT&T's objection to the latter two--but their net effect appears overstated. First, undeveloped parcels presumably will be developed in the future, and that development

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[202] This is the midpoint of the 2%-4% annual growth that Verizon envisions. Tr. 2,445.

[203] Tr. 1,436 (citing ATT-BA-24).

should be recognized in an ultimate demand analysis. The adjustment therefore should be -5%, representing an averaging of the initial and end states. In addition, the effect of customers lost to competitors will be offset somewhat by the effect of customers acquired as undeveloped parcels are developed. As Verizon properly notes, it cannot be assumed that the freed-up lines will always be available where needed, and the offset should not be overstated. Still, a better adjustment for customers lost to competitors appears to be -5%. Applying these adjustments, along with the 90% breakage adjustment, suggests a distribution fill factor of 49.725%,[204] which should be rounded up to continue the fill factor of 50%.

2. Other Fill Factors[205]

Verizon proposed a fill factor of 84% for RT electronics, which it sought to justify as the 90% objective fill factor, adjusted downward to allow for growth (4%) and churn (2%). The CLEC Alliance and WorldCom urge a 90% factor, arguing, in effect, that churn and growth are adequately accounted for in the difference between 100% fill and 90% fill.

I recommend a fill factor of 88%. Verizon has explained why the objective fill factor of 90% does not in itself allow adequately for growth and churn, but it has not shown that its separate growth and churn factors are both necessary and reasonable. Recognizing again the goal of fairness as well as Verizon's burden of proof, it seems reasonable to allow a total of 2% for growth and churn.

For RT enclosures, the CLEC Alliance and WorldCom recommend a utilization factor of 84%, which they argue should

[204] The calculation is 65% x (100%-5%-5%-5%=85%) x 90%.

[205] The fill factors for house and riser cable, for interoffice transport, and for line sharing test units are discussed separately, under their respective headings.

be attainable on all routes in a forward-looking setting[206]; they contend that Verizon contemplated fill factors as low as 18%. Verizon responds that the 18% utilization factor involved an atypical design situation and that the average fill factor ranged up to 70.9% in the Manhattan zone. (The factors in the major cities and rest-of-state zones were 56.7% and 44.8%, respectively.[207]) Verizon sees no basis for the 84% factor, citing various breakage and location constraints that limit flexibility in choosing the size of RT enclosures and pointing to the need to allow for growth and churn.

Verizon has shown that the 18% fill factor cited by WorldCom witness Ankum was indeed anomalous, and it has identified various qualitative considerations that strongly suggest a fill factor of 84% is too high. But that is a different matter from a quantitative showing that its own fill factors are proper and forward-looking. Recalling once again that Verizon bears the burden of proof, and recognizing that there is considerable flexibility in designing RT enclosures (even if not as much flexibility as WorldCom and the CLEC Alliance would have it), I recommend that Verizon's proposed RT enclosure fill factor in each zone be adjusted upward by 15%.[208]

The utilization factor for central office terminals has already been alluded to, for it depends in large part on the number of RTs per COT. The CLEC Alliance and WorldCom recommend a factor of 90%, premised on maximizing the number of remote terminals per COT and on the ability to adjust COT equipment to an optimally efficient size. Verizon regards the 90% utilization factor as arbitrary, contending that the documents cited by the CLECs do not, in fact, support the claim that 90% is a reasonable factor. It cites the difficulty of augmenting

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[206] CLEC Alliance's Initial Brief, p. 98, citing exh. 355 (QSI Report), p. 75; WorldCom's Initial Brief, p. 23, citing Tr. 3,752, 3,753.

[207] Tr. 3,399.

[208] For example, the Manhattan fill factor would be 81.5%.

COTs on demand and the consequent need to include, on installation, all the capacity that will ultimately be needed.

Verizon argues persuasively that the CLECs misread the internal documents that they cite in support of the 90% fill factor.[209] But I have already noted that the COT fill factor should recognize Verizon's failure to show convincingly that more than two RTs per COT would be unacceptable. To take account of that possibility, and in recognition once again of Verizon's burden of proof, I recommend setting rates on the premise of a 15% increase in this fill factor as well.

OSS Costs

AT&T urges rejection of Verizon's proposed charge of 58¢ a month per loop for systems providing access to operation support systems. It suggests recovery of the costs is subject to the conditions set forth in the Commission's order approving the NYNEX/Bell Atlantic merger.

Verizon responds, correctly, that these are not cost onsets within the meaning of the Merger Order related to the development of OSS access systems; they are, rather, software maintenance costs and hardware carrying costs whose recovery is permitted.

Deaveraging Issues

1. Environmental Factor

To test its intuitive hypothesis that the amount of work required to install outside plant might vary by geographic area, Verizon analyzed its engineering and construction records information system (ECRIS) data to identify such variation and found higher costs in dense areas such as Manhattan.[210] The study compared, by geographic region corresponding to Verizon's nine

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[209] Verizon's Reply Brief, p. 92, n. 236.

[210] It should be recognized that previous deaveraging studies took account of differences in technology, equipment deployment and loop length in the different density zones. They did not take account of zone-specific differences in the amount of work required to install outside plant.

strategic business units (SBUs) and three density zones, the actual labor time required to perform outside plant work operations against the standardized time for the same work operations. The standardized times, developed by Verizon's consultant H. B. Maynard and Company, estimate "the standard, average time for performing the function, regardless of where in the State it is performed, except for minor differences in the travel time to and from the work site."[211] Actual and standard times alike take account of the types and amounts of plant that is placed, rearranged, or removed; but the actual time considers, as well, factors that depend on locale and density specific conditions. These include, among others, "traffic conditions at the work site; terrain requiring hand digging; locations requiring the removal and restoration of fences, posts, and other objects; locations requiring landscaping; locations requiring minimum two-person crews; locations requiring the removal of waste contaminants (with contractors); locations requiring security arrangements."[212] The analysis was performed by Verizon's statistical consultant NERA, which analyzed over 388,000 individual work operations associated with over 4,000 outside plant estimate jobs throughout the state. The study

[211] Verizon's Initial Brief, p. 137.

[212] Id., pp. 137-138, n. 313, citing Tr. 2,472-2,473.

found that the Manhattan had an actual-to-standardized-labor-time ratio of 1.59, the highest in the State, and that the statewide average ratio was 1.37. (Verizon explains a statewide average greater than 1.0 by noting that the ECRIS standardized times do not account for all the costs actually incurred in performing outside plant work, omitting the locale specific conditions that show up in actual work times.) Asserting that NERA's statistical analysis shows the differences in the ratios to be statistically significant, Verizon argues that these costs must be taken into account in determining loop costs.

CLECs object to the environmental factor. WorldCom contends that the ECRIS standard time increments are forward-looking (as Verizon itself had maintained in the First Proceeding in arguing for the TELRIC compliance of the studies it submitted there); that they were scientifically and objectively established by an independent consultant using the state-of-the-art analysis; and that they have been shown to be attainable in actual operations. It therefore regards the proposed adjustment as an $80 million retreat from forward-looking efficiency. WorldCom characterizes as unsupported speculation Verizon's attribution of the identified time differences to environmental conditions rather than inefficient work practices, and it notes that NERA's analysis of statistical significance made no effort to account for the time differences. In addition, WorldCom asserts, the ECRIS data themselves contain locale-specific costs, and there is no need for a further adjustment to recognize them.

AT&T similarly expresses confidence in the ECRIS standardized times (though it notes that even they do not consider the economies of scale that a new entrant building a new network would enjoy by reason of contiguous jobs) and regards the environmental factor as an attempt to impeach Verizon's own ECRIS data base. It alleges inconsistency between Verizon's reliance on its engineers with respect to network design and its refusal to rely on their expertise as reflected in the ECRIS data base. Z-Tel adds that Verizon has not shown

the recent outside plant activity here taken into account to be similar to the outside plant activity required, on average, to construct and rearrange all Verizon outside plant.

Verizon maintains in response that the CLECs are simply unwilling to accept evidence that costs may be higher in Manhattan than elsewhere. It denies that the adjustment impeaches the integrity of ECRIS, which works well for its intended purposes but is only enhanced as a UNE costing tool by application of this adjustment. It maintains that the work operations that were studied were completed over a period of almost two years and are representative of the relevant activity; and it asserts that TELRIC does not require assuming away such factors as traffic, illegally parked vehicles, or weather conditions.

Verizon's environmental factor appears to be a reasonable mechanism for achieving geographical rate deaveraging, taking account of empirically derived cost differences. But Verizon is less persuasive when it dismisses in a footnote the peculiarity that the statewide average actual-to-standardized ratio substantially exceeds unity, explaining that the ECRIS standardized times fail to include all pertinent costs. If that is so, Verizon is, in effect, impeaching its own ECRIS estimates, as the CLECs argue. Those estimates, however, are being accepted as the basis here for analysis, and the overall cost level they imply should not be increased in this manner. I recommend that Verizon be required to recalculate the environmental factor in a manner that assumes a statewide average of 1.0 and adjusts each regional environmental factor pro rata.

2. Manhattan's Unique Status

The CLEC Alliance contends that Verizon has failed to capture the economies of scale that can be achieved in high density areas such as the central business district of Manhattan. It compares the loop cost in downtown Chicago of $2.59 to Verizon's Manhattan cost of $17.12, asserting that "the

sheer magnitude of this disparity suggests a concerted effort to conceal [Verizon's] economies of scale by averaging many cost characteristics on either a statewide or service area wide basis."[213] In its view, the disparity with Chicago suggests that Verizon has overstated loop rates in the rest of the State as well.

Verizon does not specifically respond but, as noted, contends that there are factors in Manhattan that tend to increase costs as well as decrease them. That appears to be so; in any event, a bare comparison to a rate elsewhere does not warrant modification of a rate derived here on the basis of a sound process.

3. Deaveraging Zones

Verizon's three-zone deaveraging plan was described earlier. FairPoint proposed an alternative, revenue-neutral, deaveraging plan intended to foster local exchange competition in areas now constituting part of the "rural" region. It offered five proposals, all intended to insure "that the Rural rate band would . . . apply to truly rural areas and not to the downtown area of smaller cities and towns. Each proposal is grounded in the complementary principles that there is a strong correlation between population density and loop costs, and that areas with similar population density should be grouped into the same unbundled loop rate band."[214]

FairPoint's witness Dawson determined that population density was the predominant factor affecting loop costs. He reasoned that densely populated areas required shorter cables and shorter drop wires; permitted the use of more copper pairs per cable, thereby reducing unit costs; and warranted greater use of new technology. He then determined that density statistics for downtown areas of small cities now included in the rural zone resembled those of larger cities now included in

[213] CLEC Alliance's Initial Brief, p. 87.

[214] FairPoint's Initial Brief, p. 2.

the urban (non- Manhattan) zone. On that basis, he proposed separate bands for Manhattan, the urban zone, the suburban zone, and the rural zone. Actual threshold levels for each zone would be specified after further analysis by Staff, but the urban band would include portions of any city, not just large cities, having sufficiently high densities. Meanwhile, the rural band would be assigned only to areas that are truly rural. Mr. Dawson estimated the effect of his rate design, assuming no change in overall loop revenue requirement, to be maintenance of the Manhattan rate of $11.83; an increase in the urban rate from $12.49 to $13.00; and separation of the current rural zone, with its rate of $19.24, into a suburban zone with a rate of $17.00 and a rural zone with a rate of $25.00.[215]

Mr. Dawson offered four alternative proposals: relating loop costs more directly to the distance between the particular area and the central office; relating loop costs directly to loop length; retaining the current three-zone structure but redefining the bands so that more cities would be included in the urban band; and grafting on to Verizon's proposal a fourth rate band with a threshold of 150 access lines per square mile.

Verizon contended that the current rate zones are derived from TELRIC-compliant cost studies, but FairPoint stresses the Commission's discretion to design rates, on the basis of those studies, that take account of policy considerations. It alleges that such policy considerations led the Commission to adopt a low loop rate in Manhattan in order to jump start competition there, and it urges a similar initiative for other regions of the State. It contends that its proposal would benefit not just itself but all CLECs planning to serve smaller cities (and their customers); that increased UNE rates in the residual rural section will not impede the development of competition, given how little competition there is in the existing rural area; and that the Commission should choose among

[215] Id., p. 6.

FairPoint's proposals in part on the basis of which one would be easiest to administer.

Verizon responds that its own proposal was developed in cooperation with the CLECs and is opposed only by FairPoint. It contends that the plan would benefit FairPoint alone, does not reflect costs, "would be virtually impossible to administer,"[216] particularly if FairPoint is seeking to deaverage rates at a sub-central-office level, and would foreclose any possibility of competition in the rural parts of the State. It disputes FairPoint's expectation that the loop rate in the residual rural area would rise only to $25.00, suggesting that it might go as high as $36.00. Verizon questions the basic premise of FairPoint's proposal, noting that while loop cost may be correlated with population density at some level, the true predictor of costs is loop density, for which population density is only a surrogate. Beyond that, it maintains, it is necessary to distinguish between density in a central office serving area and density in a specific portion of that serving area, which may encompass a variety of population densities. In a large city, the high density area will cover a greater portion of the central office serving area than will be the case in a small city.

In response, FairPoint reiterates its policy arguments in favor of its proposal, stressing that it is now time to extend competition to a geographic segment that has not yet attracted it, and it says it does not object to Verizon's recovering the administrative costs of revising its rate structure in accordance with FairPoint's proposals.

FairPoint's concern for the development of local service competition in smaller cities is understandable, but Verizon has shown FairPoint's proposals, unsupported by any other party, to be flawed in both theory and practice. Among other things, there appears to be a very significant difference, not adequately recognized by FairPoint, between a densely

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[216] Verizon's Reply Brief, p. 19.

populated area large enough to encompass an entire central office (or more) and one that constitutes only a portion of a central office that comprises as well areas of much lower density. I recommend rejection of FairPoint's proposals and continued use of three-zone deaveraging in the manner proposed by Verizon and seemingly acceptable to all other parties.

Land and Building Loading[217]

1. Double Count Adjustment

WorldCom witness Dr. Ankum identified a double count of Verizon investments in remote terminal huts, which were included not only as direct investments but also as building investments taken into account in calculating the land and building factor. Verizon acknowledged the double count, lacked the data needed to remove hut investment from the overall land and buildings factor, and therefore dealt with the double count by "zeroing out" hut investment in the link cost calculator.

Verizon also accepted, either specifically or in principle, two adjustments to the land and building factor proposed by CLEC Coalition witness Dr. Kahn. As Dr. Kahn recommended, it adjusted the denominator of the land and buildings factor to include collocation equipment; and it excluded from the L&B factor the portion of building investment recovered through direct collocation charges. These modifications reduced the L&B factor from 0.186788 to 0.173151 and the corrected factor was applied to all central office equipment investment.

In its brief, WorldCom argues that these adjustments should be expected to reduce costs but, as implemented by Verizon, turn out to increase loop costs by more than $1 a line, effectively replacing about $19 million in direct hut enclosure investment costs with almost $370 million in indirect land and buildings recovery. It adds that Manhattan, which never had any

[217] This is not specifically a loop cost issue, but the parties for the most part argued it as such and it therefore is considered here.

direct hut investment, is now burdened with an additional $85 million of indirect land and buildings investment.

WorldCom presents in detail the calculations that lead to this result,[218] alleging, in effect, that Verizon fundamentally (and without explicit notice) changed its costing method. Initially, it says, the land and building factor was not applied to loop investments other than COTs, for the factor is associated only with equipment housed in central offices and COTs are the only loop equipment so housed. In recalculating the factor, however, Verizon applied the L&B factor not only to COT investments but also to enclosures, tower equipment, common costs, and channel units, thereby adding $370 million of land and building investments. These changes, according to WorldCom, were not identified by Verizon in its testimony and can be detected only through careful scrutiny of Verizon's calculations. More substantively, the change introduces a new double count, between the right-of-way costs already added to outside plant investment for each remote terminal location and the L&B investment now loaded on the outside plant. And since hut investments were already recovered indirectly through the land and building factor, the additional land and building recovery associated with the new calculations effectively retains the initially identified double count.

In response, Verizon defends its calculations. It explains that it corrected not only the double count identified by WorldCom but also the mismatch between the inclusion of hut investment in the numerator of the land and buildings ratio and the exclusion from the ratio's denominator of the equipment enclosed in the hut. The mismatch could not be corrected by excluding hut investment from the numerator (for the same reason that the double count could not be corrected by removing hut investments from overall land and building costs), and Verizon therefore added remote terminal equipment investment to the denominator. That change transformed the factor into one

[218] WorldCom's Initial Brief, pp. 36-38.

applicable to equipment located in huts as well as in central offices, and it was therefore applied to RT equipment as well as to central office equipment. Verizon contends that the increased loop costs cited by WorldCom reflected not an increase in the total land and building costs recovered through UNE rates but was offset, via the reduction in the L&B factor, in the land and building costs recovered through rates for other UNEs, such as local switching. It contends that both approaches--application of the L&B factor to central office equipment only or to central office and hut-housed equipment alike--are equally valid. Nor does Verizon see any anomaly in applying the new L&B factor to RT equipment in Manhattan, noting that Manhattan's reduced hut requirements are properly reflected in the development of the L&B factor and that hut investment is neither over-recovered or under-recovered on a statewide basis. Calculation of a separate L&B factor for Manhattan, Verizon adds, would produce a higher figure due to the higher per-foot costs of building space.

WorldCom understandably characterizes the result it challenges here as counter-intuitive. But Verizon's reply brief reasonably explains, step-by-step, the result reached in the recalculation, and I see no basis for recommending any adjustment on this point. That conclusion, of course, rests in large part on Verizon's representation that total L&B costs recovered through UNE rates will not be increased, and that the increased loop costs will be offset by reduced recovery of L&B expense through rates for other UNEs. It says it will recalculate those rates as part of its compliance filing,[219] but it should instead do so sooner, in its brief on exceptions, and demonstrate there that the reductions in those rates are adequate to avoid any double count.

2. Collocation Equipment

[219] Verizon's Reply Brief, pp. 15-16, n. 33.

Ever since Module 2 of the First Elements Proceeding, there has been a concern, raised by some parties and recognized by the Commission, over possible double recovery of land and building costs through direct charges (recurring and nonrecurring) related to the space occupied by collocation equipment and the loading of land and building costs on UNE rates, retail rates, and certain collocation charges. In the present proceeding, the parties (on this point, primarily, the CLEC Coalition and Verizon) are in substantial agreement on how to correct for the problem through a downward adjustment to the land and building factor; the remaining disagreement concerns the magnitude of the adjustment.

Verizon proposes an offset of 1.1019%, based on the amount of space in its central offices for which there were pending or completed physical collocations as of May 1999. The CLEC Coalition sees a need for a forward-looking adjustment to that figure, given that the rates to be set will take effect sometime late in 2001 and will likely be in effect for several years. It cites evidence that the assignable floor space in Verizon's central offices has remained largely constant for the past two years; that the floor space occupied by collocators increased by 74% between May 1999 and May 2000; and that the central office space attributable to physical collocation continues to grow.[220] It proposes to take the most recent percentage (1.764) and project it through May 2002, assuming a conservative growth rate; that yields a proposed adjustment factor of 3.2616%, which the CLEC Coalition advocates.

Verizon objects to a linear projection on the basis of the growth from May 1999 to May 2000, given that one year of data provides an inadequate basis for projection and that there are a variety of uncertainties regarding future collocation demand. It asserts that its own figure is conservative, since it assumes that the space occupancy ratio of the 187 central

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[220] CLEC Coalition's Initial Brief, p 12, citing Exhibits 449 (response to CC-VZ-169) and 410 (response to CC-VZ-146).

offices in which collocators are present can be extrapolated to all central offices.

Choosing the factor is difficult, because it requires projection on the basis of limited data. Verizon is right to express concern about a linear projection on the basis of a single year's growth; but its own figure, based on a single historical point, seems clearly too low, given the growth in collocation occupancy and the likelihood that it will continue. (Verizon suggests its figure is conservative in assuming that the occupancy rate for the 187 central offices housing collocators can be extrapolated to all central offices, but any such conservatism is seriously vitiated by the CLEC Coalition's observation that those 187 central offices account for more than 86% of the assignable space in all 525 central offices.[221])

Taking all of these factors into account, (and, in particular, the apparent on-going increase in collocation occupancy), I recommend a downward adjustment of 2.5%.

3. Application of a Forward Looking to Current Adjustment

In addition to endorsing WorldCom's arguments, AT&T objects to Verizon's application of an FLC adjustment to reduce the land and building factor's denominator (and consequently increase the factor) to reflect aggregate TELRIC investment. It surmises that Verizon's adjustment is premised on the smaller space requirements of forward-looking switches and suggests that the reduction therefore should be applied to building investment (the numerator) rather than switch investment (the denominator), thereby reducing the factor.

Verizon responds that there is no evidence that forward-looking switches occupy less space than those in place in 1998, when its study was done. In addition, the purpose of the FLC adjustment is simply to overcome the absence of data

[221] CLEC Coalition's Initial Brief, p. 12, n. 25, citing Ex. 390, p. 1 of 35.

that would permit direct computation of the aggregate TELRIC switching investment.

Verizon has shown the adjustment to be proper in concept. As with the FLC generally, however, the amount of the factor appears overstated; it should be adjusted in a manner consistent with the FLC adjustment above.

Link Cost Calculator

Verizon's link cost calculator pulls together the various loop cost inputs and calculates an overall result. The CLEC Alliance criticizes the calculator in concept, charging that it is unverifiable and convoluted and lacks design algorithms that guard against absurd results. It urges the Commission to require Verizon to apply safeguards to the calculator or at least validate its results.[222]

Verizon responds (in addition to denying the alleged absurdities) that the calculator is just that, not a costing model, and that "the intelligence underlying Verizon's studies lies elsewhere."[223] That is a fair description of the calculator's function, which appears to be purely ministerial; no process-related modification is needed.

AT&T alleged ten specific errors in the calculator's operation. Verizon's rebuttal testimony acknowledged and corrected for two of them (items A and B, as enumerated by AT&T[224]); the remainder (including one, item G, as to which Verizon acknowledged the error but applied a correction AT&T deems inadequate) are here discussed.

Item C. AT&T excluded network interface device (NID) investment in those circumstances where fiber was assumed to be run directly to the customer premises, obviating a NID, and replaced the associated cost with a $5.00 per line block terminal cost. Verizon accepted AT&T's argument in part but

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[222] CLEC Alliance's Initial Brief, pp. 63-64, 70-72.

[223] Verizon's Reply Brief, p. 95.

[224] AT&T's Initial Brief, pp. 66 et seq.

recalculated the adjustment by applying the environmental factor to the installation cost; AT&T claims there is no basis for doing so inasmuch as NID installation times are not derived from ECRIS, whose inadequacies are said to be remedied by application of the environmental factor. Verizon responds that the proper replacement for a NID is a KRONE block on backboard (an allegation AT&T regards as unsubstantiated; Verizon contends, however, that AT&T has suggested no alternative) and that application of the environmental factor is warranted inasmuch as NIDs are generally installed in conjunction with cables and terminals and it is therefore reasonable to assume that they are affected by the same factors.

The record supports the use of KRONE blocks and the application to their installation of the environmental factor (modified, of course, as recommended above). AT&T's $5.00 figure is unsupported and should be rejected.

Item D. AT&T adjusted the link cost calculator to eliminate the cost for copper riser cable in situations in which fiber is assumed to go directly to the customer premises. It sees no support for Verizon's assertion that a fiber-to-customer-premises arrangement does not mean that the RT is located precisely next to each customer's demarcation point, and it asserts that Verizon has failed to prove the need for the copper distribution riser investment reflected in its loop costs.

Verizon responds that the situation at issue is one in which the fiber goes directly to the customer's building but copper riser would still be needed to reach customers on upper floors; notes that this description was part of the sworn testimony of its panel[225]; and professes not to understand the additional substantiation that AT&T would regard as remedying the alleged failure of proof. It asserts that AT&T has not shown any alternative arrangement to be more efficient and characterizes as "self-evidently absurd" the implicit contention

[225] Tr. 3,368.

that an RT should be located on every floor in order to obviate riser cable.[226]

Verizon has adequately explained the need for copper cable in this type of situation. But while Verizon is fully persuasive in arguing that copper riser cable will be needed at least sometimes and perhaps most of the time, AT&T suggests as well that Verizon has failed to establish the frequency with which it is needed or to justify the amount of copper it assumes. Verizon should provide further detail in its brief on exceptions.

Item E. AT&T adjusted Verizon's calculations to replace the use of NEC DLC equipment with less costly Litespan equipment, contending that Verizon had failed to substantiate its assertion that only the Litespan prices were used in the calculator. Verizon responds that the price lists used in the link cost calculator included only the price of Litespan equipment, regardless of field engineering recommendations in favor of NEC that predated the policy of standardizing on the Litespan equipment. It suggests that AT&T misconstrues a generic term in the price table as referring specifically to the NEC product.

Verizon's response is adequate; no adjustment is needed.

Item F. AT&T substituted an average installed pole price of $417 (consistent with its own testimony) for Verizon's range of $385 to $765 per pole. It characterizes this cost as consistent with an FCC survey evaluated by the National Regulatory Research Institute (NRRI) showing total installed costs of $357 per pole, and it regards that as a more forward-looking estimate than a figure based on Verizon's own embedded costs.

Verizon contends it showed in rebuttal that AT&T's figures were based on a biased and misleading analysis of the survey data, focusing only on the low-end data points, and

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[226] Verizon's Reply Brief, p. 98.

disregarding AT&T's own testimony on geographic variation in these costs.[227] It also charges that AT&T fails to explain why the forward-looking cost of a low-tech facility such as a pole should differ from actual current prices.

Verizon's rebuttal demonstrates both the propriety of not using a statewide average and the flaws in AT&T's analysis of the data it cites. Verizon's uncritical reliance on unadjusted embedded costs is troublesome, however; for even though poles are a low-tech facility, it is entirely possible that more efficient installation procedures, for example, could reduce installed costs. On exceptions, Verizon should present an analysis of recent trends in its own pole costs; for now, I recommend a 10% downward adjustment to Verizon's figures.

Item G. AT&T adjusted Verizon's figures to reflect equal sharing of poles outside Manhattan with electric utilities and, in the middle density zone, equal sharing of the telephone portion of pole investment between telephony and cable. Verizon acknowledged that it erred in not doing so, but AT&T contends in brief that Verizon in effect took back that concession by eliminating "an adjustment to the multiple sheaths between poles that [Verizon believed was] not appropriate in the distribution portion of the link."[228] AT&T contends that Verizon has not supported the change to AT&T's adjustment.

Verizon replies only that it corrected its error "using the same sharing factor as was used for feeder cable structure."[229]

While Verizon has the burden of proof in this proceeding, its opponents have the burden of going forward with evidence challenging particular aspects of Verizon's study. Verizon has not specifically shown why AT&T's multiple sheath adjustment is inappropriate, but given the posture of the issue, it had no need to, for AT&T never explained why the adjustment

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[227] Id., p. 99, citing Tr. 3,368-3,371.

[228] AT&T's Initial Brief, p. 72, citing Tr. 3,375.

[229] Verizon's Reply Brief, p. 100, citing Tr. 3,375.

was offered. AT&T simply called for sharing of investment,[230] and Verizon applied the sharing factor.[231] For now, that appears to end the matter, but AT&T may provide further explanation on exceptions for the aspect of its adjustment that Verizon did not adopt, and, if it does so, Verizon may respond.

Item H. AT&T eliminated the application of the 40% cable fill factor to pole investment, on the premise that the poles it costed out had ample space, after accounting for sharing, to accommodate additional cable strands. It disputes--or at least regards as unverifiable--Verizon's denial that a fill factor is applied to poles, citing Verizon's acknowledgement that "pole investment per working pair is determined by dividing pole investment per pair by the utilization rate for the supported cable," and it argues that if pole investment per pair was based on working pairs, application of the cable utilization rate would double count the fill factor.[232]

Verizon responds that its testimony, including the sentence preceding the one quoted by AT&T, makes clear that pole investment per pair was based not on working pairs but on the size of the supported cable, that is, on the total number of pairs in the cable. It charges that AT&T "contorts logic and plain English in the desperate search for some latent ambiguity that will support AT&T's claim that Verizon has not . . . [met] its burden of proof.[233]

Verizon's explanation is adequate; no adjustment is needed.

Item I. AT&T charges that Verizon in effect applies too low a fill factor to innerduct by first assuming that each conduit carries three innerducts, two of which are used and one of which serves as a spare, thereby establishing a tacit

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[230] Tr. 1,429, item G.

[231] Tr. 3,375.

[232] AT&T's Initial Brief, p. 73, citing Tr. 3,371.

[233] Verizon's Reply Brief, pp. 100-101.

utilization factor of 66.7%; and then applying a 60% utilization factor, reducing the effective factor to only 40%. AT&T would eliminate that second step. It contends that Verizon's rebuttal explanation, which relied on engineering judgment, has not been shown to be consistent with TELRIC costing and that Verizon's effective unused capacity of 60% "cannot be justified as either forward-looking or efficient."[234] In response, Verizon cites its rebuttal explanation that the 60% utilization factor accounts for the spare ducts in a duct bank rather than the spare innerduct in a duct, and it alleges no support for AT&T's challenge to the efficiency of these arrangements.[235]

Verizon's rebuttal describes in detail the calculations underlying its result but fails to disprove the reasonable allegation that it overstates costs through overlapping fill factors that provide more excess capacity than is needed. Verizon has not borne its burden of proving these arrangements reasonable, and AT&T's adjustment should be adopted.

Item J. As with respect to poles, AT&T eliminated application of a cable fill factor to conduit, charging that here, too, if Verizon's calculation of conduit cost per pair were based on working pairs, application of the 60% duct utilization factor would result in a double count of the fill factor. Verizon responds by citing its rebuttal testimony that it does not apply a cable utilization factor to conduit and that conduit investment per working pair is developed by dividing conduit investment by the number of working pairs in the cables supported by it, as a result of which conduit investment per working pair declines with cable size.[236]

Verizon's response is persuasive; no adjustment is needed.

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[234] AT&T's Initial Brief, p. 74.

[235] Tr. 3,372-3,373.

[236] Tr. 3,374.

Dark Fiber

"Dark fiber consists of a continuous fiber optic strand within an existing in-place fiber optic sheath . . . owned by Verizon but . . . not connected to electronic equipment needed to power the line in order to transmit information."[237] Verizon offers dark fiber only on an as-is, where-available basis, "where in-place spare facilities exist."[238] Rhythms/Covad accordingly argue that Verizon incurs no capacity costs associated with dark fiber and should be permitted to recover only the operation and maintenance costs of dark fiber actually used by CLECs. They argue as well that no fill factor should be applied to dark fiber inasmuch as fill factors are intended to compensate Verizon for the costs of spare, but most likely unused, capacity; but no spare dark fiber capacity need be provided. In addition, they contend that dark fiber is itself the product of installing spare capacity whose cost is already recovered through the fill factors applied to loops and interoffice facilities.

Verizon responds that even if it incurs little or no investment-related short-run cost in providing a spare facility, TELRIC requires allocating the total, forward-looking long-run cost among all users of the element, CLECs included. It contends as well that the utilization factor should apply to all fiber used by CLECs, regardless of whether it is dark or lit, inasmuch as there is no real distinction between the two sorts of cable and Verzion draws cable to fill dark fiber orders from the same pool that it uses to provision other types of fiber. In each case, it contends, the order means that there is one less spare available to provide a cushion for growth and churn. Rhythms/Covad reply that Verizon's proposed ability to recapture dark fiber from CLECs when necessary means that the purchaser will not have complete use of the facility as TELRIC

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[237] Verizon's Initial Brief, p. 155.

[238] Id., p. 156, citing Tr. 5,646 and Verizon's tariff PSC 916 §5.20.2.4.

contemplates, and that it is Verizon, not Rhythms/Covad, that departs from TELRIC in this regard.[239]

That dark fiber is provided only on an as-available basis would not in itself mean that CLECs purchasing it should pay no capacity costs. As Verizon reasonably argues, when all is said and done, the provision of a dark fiber cable would mean one less spare was available for other purposes, and the purchasing CLEC should bear the associated costs.

What may make an important difference, however, is the possibility that even after a dark fiber cable is provided, Verizon may be able to recapture the fiber if needed. That would mean that the available spare capacity had not been diminished, at least not to the same extent as if the fiber were irretrievable; and the capacity costs associated with providing the fiber would be correspondingly reduced or eliminated. The record is unclear on Verizon's ability to effect such a recapture,[240] and Verizon should clarify that situation in its brief on exceptions.

House and Riser Cable

"House and riser (H&R) is a communications path within a multi-story building that provides access to the network side of a customer's [network interface device] from a point of interconnection within the building (frequently in the basement)."[241] Verizon's study identified the investment cost of the riser cable itself and the material and labor costs associated with terminating it at each end--the basement point of interconnection and the end user's premises. House and riser rates comprise (1) house and riser access service--the element itself as leased--and (2) house and riser connection service, encompassing additional equipment needed to connect the

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[239] Rhythms/Covad's Reply Brief, p. 19; Tr. 5,647-5,648.

[240] Rhythms/Covad cite the claim only to a New Jersey proceeding (Tr. 5,646, n. 68).

[241] Verizon's Initial Brief, pp. 160-161.